

REMARKS

The Office Action of August 8, 2006 has been received and carefully considered.

Restriction Requirement

As indicated in the previous Office Action, Applicant elected Group I with traverse, and elected "alkaline buffer" as Species A, "centrifugation" as Species B, and "further concentration by evaporation" as Species C as the Examiner required. Claims 3, and 9-20 have been withdrawn in view of the Restriction Requirement.

In addition, Applicant believes that claim 9, directed to the product made by the process of claim 1 should be rejoined to the examined claims in view of Applicant's amendments and following remarks, because there is no teaching in the cited art of an alkaline aqueous extract of butter cake meal enriched in saponins as now claimed, and therefore the product is novel.

Applicant has amended claims 1, 2 and 5 to further clarify and define that which the Applicant considers to be the invention. No new matter has been added by these amendments. Claims 1, 2 and 4-8 are currently under examination.

Claim Objections

The Examiner objected to the title of the application as not sufficiently descriptive. Applicant has amended the title to replace "Plant Extracts" with "Preparation of an Aqueous Extract of Butter Cake Meal from a Shea Butter Tree (*Butyrospermum parkii*) Enriched in Saponins". The title is fully supported by the specification at page 3, lines 2-26 and elsewhere.

The Examiner objected to claim 5 due to the use of the word "at" and requested that it be replaced by the word "over". Applicant has amended claim 5 as requested.

Rejections Under 35 U.S.C. §112

The Examiner rejected claims 1-2 and 4-8 under 35 U.S.C. §112, second paragraph, because it is unclear as to what ingredients the claims are directed to. The Examiner has suggested introduction of the Latin genus/species to claim 1 to make the claims more definite. The Examiner also objected to the terms "on the basis of", and "waste product from a shea butter tree". Applicant submits that the amendments to claim 1 now clarify the process that Applicant considers to be the invention and renders these rejections moot. Applicant respectfully requests withdrawal of the rejection.

With regard to the Examiner's rejection of claim 7, the Examiner objected to the term "an extract containing at least 1 weight % dry matter" because the Examiner states that it is unclear whether Applicant is claiming a solution containing 1 weight % of butter tree extract in the form of dry matter, or if the actual extract of the shea butter tree contains 1 weight % dry matter. Applicant respectfully traverses this rejection.

Claim 7 is dependent on claim 1, which specifies a method for preparing an alkaline aqueous extract of butter cake meal from a Shea butter tree, enriched in saponins, said extract being separated from the butter cake meal in step (iv). Applicant invites the Examiner to review the data in Example 5, Table 2, at page 14 of Applicant's specification. In the table, three different extraction ratios are presented. For the 1:20 ratio, Applicant starts the claimed process with 300 g of butter tree cake and adds

6 liters of water to begin the process (step (i) of the claimed process. At the end of the 15 minute incubation at 80°C with 6 g sodium carbonate (step (ii) of the claimed process), the extract containing solution is filtered, leaving a extract solution of 3170 g (step (v) of the claimed process). Further processing of the extract by evaporation or centrifugation results in a dry matter product weighing 66.6 g. Applicant defines the dry matter weight %, as a ratio of the weight of the dried extract over the weight of the extract solution after performing step (iii) of the claimed process. In this example, $66.6 \text{ g dried extract} / 3170 \text{ g extract solution} = 2.1 \text{ weight \% dry matter}$.

Therefore, Applicant submits that it is clear to one of ordinary skill in the art what the definition of the term "weight % dry matter" is when reading the specification, and Applicant respectfully requests withdrawal of this rejection.

Rejection Under 35 U.S.C. §102(b)

Claims 1, 2 and 4 are rejected as anticipated by Oura et al. (USP 4,229,483) as evidenced by Noller (Ann. Rev. Biochem. 1945; 14:383-406). According to the Examiner, Oura et al. disclose "the mixing of shea nut meal with aqueous ethanol ...in the presence of alkali, wherein the alkali is used in the form of an aqueous solution". The Examiner refers to column 3, lines 59-68 and continued into column 4, lines 1-8 for the basis of this disclosure. Applicant believes that the Examiner is misstating what Oura et al. actually teaches, and traverses this rejection.

Oura et al. teach a method for preparing a colored matter from shea nut meal as a food additive. The untreated colored ground shea nut meal has an unpleasant smell and taste. These unpleasant

properties are reduced by washing with water and/or alcohol in a concentration from 10-99%, and/or heating the ground meal.

In other efforts to improve taste and color of the nut meal food additive, Oura et al. carry out the heat treatment on the ground nut meal dissolved in five volumes of 20% palm oil, which is then heated and subsequently filtered off under pressure (see, Oura et al. at Example 33).

Similarly, to change the color of shea nut meal additive, which has not been subject to any prior extraction, Oura et al. add different quantities of phosphoric acid or potassium carbonate to the ground meal prior to the heat treatment at 130-150°C (Oura, Examples 8-18, table 2); however the heating steps in the presence of acid or alkali are not performed while the shea nut meal is in solution. Examples 8 to 18 of Oura et al. indicate that the acid or alkali is dissolved in a 20 ml volume, and then added to the 100 g of ground nut meal in a ceramic heating bowl. At best, the nut meal mixture is only moistened. The mixture is then heated.

One of ordinary skill in the art would understand that the Oura et al. process is not an extraction. Note also that the pH value indicated under Table 2 in Oura et al. has been determined after the heat treatment.

Nowhere do Oura et al. disclose an extraction of shea nut meal under alkaline conditions. Applicant's present invention is the first disclosure of alkaline extraction of butter nut meal protecting the extractable compounds, including the saponins, from hydrolysis during an extraction and a subsequent concentration step and storage (See, paragraph [0014] in the instant application).

In contrast, the product taught in Oura et al. is a food additive made with ground shea nut meal. Oura et al. teach that the shea nut meal is ground to a fine powder (75 um) suitable for

mixing with food to impart a brown coloring. The whole disclosure of Oura et al. is directed to removing the natural unpleasant odor and flavor from this ground up nut meal product, so that it can be added to food for coloring. This is not what is taught or claimed by Applicant.

Applicant's application discloses and claims a process for extraction of saponins from butter cake meal, by adding a proportionally large volume of water to the butter cake meal, and heating the liquid suspension under alkaline conditions, and separation the extracted liquid by filtration or other means and discarding the remaining butter cake meal solids.

The heating step cited by the Examiner in Oura et al. (column 3 line 59) is the heat treatment described in the preceding lines 40-58. This heat treatment is performed by directly heating the ground shea nut meal, or it can be performed after the shea nut meal was previously treated by a washing and/or soaking step (column 3 lines 40-43). Oura et al. refer to the heat treatment as "remarkably reducing the unpleasant smell and taste" of the product. When Oura et al. refer to the heat treatment being carried out in the presence of alkali, it does not mean that the nut meal is suspended in an alkaline solution as in Applicant's claimed invention. It is a small volume of basic solution which combines with the heat to give the shea nut meal a darker color tone for use as a food additive.

Applicant submits that in view of Applicant's amended claim 1, Oura et al. do not teach the extraction of aqueous butter tree cake under alkaline conditions. Nowhere in Oura et al. can there be found any disclosure of alkali or acid being added during the washing with water and/or alcohol. The pH values above 7 to which the Examiner refers are from measurements on shea nut meal

which has not been washed, but which has been heat treated in the presence of a small volume of potassium carbonate (see Oura et al. column 6, Table 2).

The basis of this rejection appears to be due to the Examiner misreading the disclosure of Oura et al. In the middle of page 13 of the Office action, the Examiner refers to "the solids can be removed by filtration (See column 7, Example 32)". Inspection of Example 32 of Oura et al. reveals that the filtration discussed refers to the removal of five volumes of palm oil after it has been used as a heating medium for the nut meal, and not as part of an aqueous extraction. Thus, Example 32 has nothing to do with the preparation of an extract.

The Applicant also objects to the Examiner's characterization of the Noller reference (Noller (Ann Rev Biochem. 1945:14:383-406)) as supporting the concept that saponins are inherent to shea nut press cake (Noller p 385). Noller adds nothing to Applicant's own teaching regarding saponins. As Applicant states in the present application at paragraph [0012], saponins are ubiquitously found in all plants in nature. In fact, saponins are present in almost all parts of plants where they serve as defense against external biological attacks on the plants. At the location of the attack, the saponins are hydrolyzed and deposited as monodesmosidic saponins or free sapogenins.

Applicant's own teaching is echoed by Noller at p. 383, where the reference states, "*They (triterpenes) are distributed widely in the plant kingdom and may occur in all parts of the plant, free or combined with sugars. The glycosides constitute one group of the saponins and the aglycones formed on hydrolysis usually are referred to as triterpene sapogenins*". Thus, no matter

what kind of plant material is taken from any arbitrary plant, extraction will likely result in an extract comprising saponins.

What is not taught or suggested, in either Oura et al. or Noller, is how to perform the extraction, what other compounds are co-extracted, and what properties and applications the extract may have, or may be processed to have, as in Applicant's present application.

Applicant provides below a table which summarizes the process described in Oura et al. and Applicant's claimed process, to more clearly illustrate the differences between the two.

Process	Oura et al.	Applicant
Starting material	shea nut meal cake	shea butter tree nut cake
Step 1	Grind nut meal to 75 μ m particles	Add 4-30 parts water to make an aqueous suspension
Step 2	Heat dry powder to 130-150°C for 30 min	Add alkali such as Na_2CO_3 to make suspension alkaline
optional step 2A	Add small quantity of acid or base or glucose or amino acids in 20 ml volume/100g meal prior to heating	None
Step 3	Remove from heat and use in foods as coloring additive	Heat between about 15-95°C for 10 min to 5 hours
Step 4	None	Filter or centrifuge suspension

Process	Oura et al.	Applicant
Step 5	None	Discard butter tree nut meal solids and retain extract liquid enriched with saponins having at least 1 weight %
Optional Step 5A		Add acid or enzymes to extraction solution to enrich extract with sapogenins
Step 6	None	Further concentration and/or purification by evaporation of water and/or ultrafiltration and/or recrystallization.

As one can readily see from the above table, Applicant's process is completely different from the process taught in Oura et al. and Applicant respectfully requests withdrawal of this rejection.

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected claims 1, 2 and 4-8 under 35 U.S.C. §103(a) as unpatentable over Oura et al., in view of Noller and Vogel et al. (Fermentation and Biochemical Engineering Handbook-Principals, Process Design and Equipment (2nd Ed.)).

The Examiner reiterates the teachings of Oura et al. discussed above and then makes another apparent misreading of Oura et al., stating that "Oura further teaches that the shea nut meal treated by heating is present in a solution in an amount of up to

10% by weight, usually in a range of 0.5-5% by weight and may be used in large amount (See column 5, lines 2-6)."

Applicant does not understand the Examiner's remarks. Column 5, lines 2-6 of Oura et al. discusses the use of the treated nut meal as a coloring additive in foods. The sentence containing the phrase "...up to 10% by weight..." in Oura et al. is teaching that one of ordinary skill can add up to 10% by weight of the treated nut meal to the food to color it. It is not a description of the concentration of saponins in the extracted solution taught by Applicant.

The Examiner offers Vogel et al. for the general teaching that separating solids from liquids can be accomplished by means of evaporation, filtration or centrifugation, which is well known in the art. There is no mention of saponins or sapogenins in Vogel et al.

According to the Examiner, Oura et al. do not teach an incubation step at a temperature between 15-95°C for 10 min to 5 hours, nor do Oura et al. teach removing solids by centrifugation, or making an extract containing at least 1% by weight of dry matter. Applicant agrees. The Examiner then states that Oura et al. also do not teach "...further concentrating the shea nut meal by evaporation" (see page 15 of the Office Action). This is a misunderstanding of what is taught and claimed in Applicant's application.

As Applicant has previously pointed out in the present response with regard to the anticipation rejection, Applicant's teaching is not directed to concentrating shea nut meal. Applicant teaches the aqueous extraction of saponins under alkaline conditions from the Shea butter tree cake or nut meal.

As such, the Examiner's argument, that it would have been obvious to one of ordinary skill in the art to modify the process of Oura et al., to provide the instantly claimed invention, because at the time the invention was made, it was known in the art that upon heating the solution, the solution could be separated from the solids and that the shea nut meal solution could be dried, is misdirected. Applicant is not making or claiming concentrated or dried shea nut meal.

The burden is on the Examiner to establish a *prima facie* case of obviousness of the claimed subject matter over prior art references. In re Deuel, 51 F.3d 1552, 1557, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995). Only after that burden is met must the applicant come forward with arguments or evidence in rebuttal. Id. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness with regard to amended claims 1, 2 and 4-8, because Oura et al., in view of Noller and Vogel et al. do not teach each and every element of the claimed invention.

Applicant claims a method for making a aqueous extract from shea butter tree nut meal or cake which is enriched in saponins under alkaline conditions. The references alone, or together, do not teach Applicant's method. The references cited only teach that shea nut meal can be heated and washed and used as a food additive. There is no teaching or suggestion in any of the cited references for using Shea butter tree nut meal as a starting

material to extract saponins, or the further processing of the extracted saponins into sapogenins.

Furthermore, the Examiner has failed to provide any motivation for one of skill in the art to extract saponins from shea nut meal or shea butter tree nut meal outside of Applicant's own specification. Oura et al. are silent on saponins, and the entire reference is directed to the use of the nut meal as a coloring additive for food. Noller generally discusses saponins in all plants. Vogel et al. is a general reference to extraction and separation techniques. Because the Examiner has not provided motivation to combine the cited references, and the references themselves fail to teach each and every element of Applicant's claimed invention, Applicant requests withdrawal of this rejection.

It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for examination on the merits. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Respectfully submitted,

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